

REMARKS

This is a full and timely response to the FINAL Office Action mailed February 16, 2006. Applicant previously submitted an amendment and response to this Office Action, but an Advisory Action refused to enter those amendments, alleging that they raise new issues. The Advisory Action further noted that a distinguishing feature of the polarizer being a “full-spectrum” polarizer had not specifically claimed. Therefore, Applicant submits this amendment, expressly claiming each embodiment to be a full-spectrum polarizer. This limitation cannot be ignored and clearly defines the claims over the cited art of record. In addition, further amendments have been added to each independent claims, which further amendments more clearly define over the cited art.

Based on these amendments, the prior rejections have been rendered moot. In addition, as the Advisory Action admitted that the previous amendment raised new issues, this current amendment (being even more limiting) clearly warrants new consideration and the recognition that the art of record does not apply to these newly claimed features.

Claims 1-26 remain pending after entry of the amendment. Independent claims 1, 15, and 18 have been amended to more clearly identify novel and non-obvious features of the claimed embodiments. Specifically, claims 1, 15, and 18 have been amended to recite a full spectrum polarizer having an extinction ratio of transmittance of about $1E2-3.93E5$ at wavelengths between 470-610nm. Support for this limitation can be found in the original application at least on page 15, lines 15-17. In addition, claims 1, 15, and 18 have been amended to limit the period of the dielectric protrusions to be not exceeding 180nm. Support for this limitation can be found at least on page 17, lines 8-9 of the original application. Accordingly, the amendments add no new matter to this application.

New claims 23-28 have been added. Claims 23, 25, and 27 define a full spectrum polarizer having a transmittance T_{TM} not less than 70% over visible spectrum from 0.5 μ m. Support for this limitation can be found on page 13, lines 24-25 of the application and in Figures 6A-6B. Claims 24, 26, and 28 recite that each of the first metal layer and the second metal layer are formed of a single metal material. Support for this limitation can be found at least on page 14, lines 6-7 of the original application. Applicant submits that no new matter has been added.

Response To Objections To Specification

The disclosure was objected to for an informality. Applicant has amended the specification to address and overcome this objection.

Response To Objections To Claims

Claims 1-22 were objected to for an informality. Applicant has amended the claims to address and overcome this objection. Reconsideration and withdrawal of any objection to the claims are respectfully requested.

Response To Claim Rejections Under 35 U.S.C §103

Claims 1, 2, 6-9, 12-16, 18, 19, and 22 stand rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Zhaoning Yu, et al (CLEO '99). This rejection is respectfully traversed.

It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a single reference, the reference must disclose, teach, or suggest, either implicitly or explicitly, all elements/features/steps of the claim at issue. *See, e.g., In Re*

Dow Chemical, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988), and *In re Keller*, 208 U.S.P.Q.2d 871, 881 (C.C.P.A. 1981).

As noted above, independent claims 1, 15, and 18 are amended and now clearly recite a **full spectrum transmissive polarizer having an extinction ratio of transmittance (T_{TM}/T_{TE}) of about $1E2-3.93E5$ at wavelengths between 470-610nm.**

Applicant respectfully submits that Yu et al fail to teach or suggest at least the above-identified features. Indeed, the independent claims each require the extinction ratio of **transmittance (T_{TM}/T_{TE}) being $1E2-3.93E5$ at wavelengths between 470-610nm.** However, the simulation results of Fig. 1 indicate that there is no significant extinction ratio between TM and TE lights for Yu et al's structure due to the low transmittance for both TE and TM lights. Moreover, the extinction ratio at wavelengths between 480-580nm is less than 1 due to the inversion of transmittances for TM and TE lights at about 480nm and 580nm, which makes it impossible to function as a **full spectrum polarizer**. Referring to FIG. 2, the structure of Yu et al cannot provide a workable bandwidth for full visible spectrum even when function as a "reflective" polarizer.

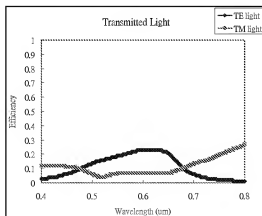


FIG. 1: the relationship between wavelength and transmittance for TM and TE

polarized lights for simulation of Yu et al's structure as a transmissive polarizer

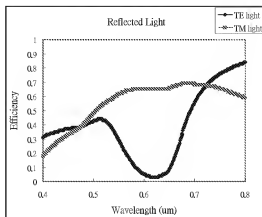
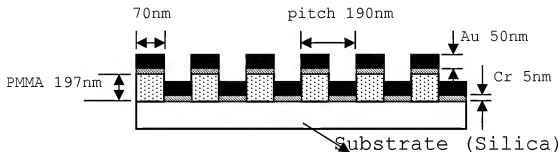


FIG. 2 the relationship between wavelength and reflectance for TM and TE polarized lights for simulation of Yu et al's structure as a reflective polarizer

NOTE: The foregoing simulations were performed by G-Solver Ver.4.2C (from Grating Solver Development Company) with the following parameters:



For at least the foregoing reasons, independent claims 1, 15, and 18 patently define over the cited art of record. In addition, claims 1, 15, and 18 have been amended to limit the period of the dielectric protrusions to be not greater than 180nm to further distinguish over Yu et al's 190nm period. Accordingly, Applicant submits that Yu et al fail to teach or suggest a full

spectrum transmissive polarizer as recited in amended claims and the rejections should be withdrawn for at least these reasons.

In addition, the Advisory Action alleges that a smaller vertical spacing could obviously represent a thinner material means that the rejection is proper based on the obviousness standard. Applicant respectfully disagrees. The vertical spacing between two metal layers is determined by the protrusion height, rather than the thickness of the metal layer. Note that since either in the present application or in Yu et al, the two metal layers are deposited simultaneously, a thinner material would present the *same* vertical spacing, *not* a smaller vertical spacing. In this regard, the Examiner's attention is called to p. 928 of Appl. Phys. Lett., Vol.77, No.7 issued to Yu et al, which states:

...The distance between the two layer is determined by the PMMA grating height, which is 200nm in this experiment...

Accordingly, the allegation that the advantages achieved by the invention are predictable is misplaced.

For at least these reasons claims 1, 15, and 18 are novel and non-obvious over the cited references. Insofar as claims 2-14, 16-17, and 19-22 depend from claims 1, 15 and 18, respectively, it is Applicant's belief that these claims are also allowable at least by virtue of their dependency.

Claims 4, 5, 10, 11, and 21 stand rejected under 35 U.S.C 103(a) as being unpatentable over Yu et al (CLEO '99) in view of Garvin et al (U.S. Patent 4,289,381).

Claims 4, 5, 10, 11, and 21 ultimately depend from independent claims that include the aforementioned elements that is novel and non-obvious over the cited references, and thus these claims are also in condition for allowance for at least that reason.

Claims 3, 17, and 20 stand rejected under 35 U.S.C 103(a) as being unpatentable over Yu et al (CLEO '99) in view of J.J. Kuta et al (JOSA A).

Claims 3, 17, and 20 ultimately depend from independent claims that include the aforementioned elements that is novel and non-obvious over the cited references, and thus these claims are also in condition for allowance for at least that reason.

New claims 23-28

Additionally and notwithstanding the foregoing reasons for the allowability of independent claims, these dependent claims recite further features that are patentably distinct from the prior art of record. Hence, there are other reasons why these dependent claims are allowable.

Dependent claims 23, 25, and 27 recites a full spectrum polarizer having a transmittance T_{TM} not less than 70% over visible spectrum from 0.5 μ m.

Applicant respectfully submits that Yu et al fail to teach or suggest a polarizer having a transmittance T_{TM} not less than 70% over visible spectrum from 0.5 μ m. To the contrary, according to FIG. 1 above, the T_{TM} of Yu et al's structure is only 30% or less from 0.5-0.8 μ m. Accordingly, claims 23, 25, and 27 are allowable over the prior art of record.

Dependent claim 24, 26, and 28 recite that that each of the first metal layer and the second metal layer are formed of a single metal material.

Applicant respectfully submits that Yu et al fail to teach or suggest the first metal layer and the second metal layer can be formed by a single metal material. To the contrary, Yu et al teach away from the invention by using a combination of Cr and Au as the metal layer. See 2nd paragraph of Yu et al. Accordingly, claims 24, 26, and 28 are also allowable over the prior art of record.

CONCLUSION

In view of the foregoing, it is believed that all pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

No fee is believed to be due in connection with this amendment and response to Office Action. If, however, any fee is believed to be due, you are hereby authorized to charge any such fee to deposit account No. 20-0778.

Respectfully submitted,

By:



Daniel R. McClure
Registration No. 38,962

Thomas, Kayden, Horstemeyer & Risley, LLP
100 Galleria Pkwy, NW
Suite 1750
Atlanta, GA 30339
770-933-9500